

Stuttgarter Beiträge zur Naturkunde

Serie A (Biologie)

Herausgeber:

Staatliches Museum für Naturkunde, Rosenstein 1, D-70191 Stuttgart

Stuttgarter Beitr. Naturk.	Ser. A	Nr. 627	18 S.	Stuttgart, 15. 10. 2001
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Four New Species of the Leleupidiine Genus *Gunvorita* Landin from Nepal (Insecta: Coleoptera: Carabidae: Zuphiinae)

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With 16 figures and 1 table

Summary

As a supplement to the recent revision of the leleupidiine genus *Gunvorita* Landin in the Oriental region (BAEHR 1998) **four** additional **new species** from Nepal are described: *G. apicalis*, *G. denticulata*, *G. distinguenda*, and *G. globipalpis*.

A revised key to the species of the genus *Gunvorita* is presented.

Zusammenfassung

Als Supplement zur Revision der Leleupidiinen-Gattung *Gunvorita* Landin aus der Orientalischen Region (BAEHR 1998) werden **vier** weitere **neue Arten** aus Nepal beschrieben: *G. apicalis*, *G. denticulata*, *G. distinguenda* und *G. globipalpis*.

Der Bestimmungsschlüssel für die Arten der Gattung *Gunvorita* wurde überarbeitet.

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1. Introduction

The recent revision on the leleupidiine genus *Gunvorita* Landin (BAEHR 1998) has brought the number of species of that genus to 16 and was based mainly on the rich samples collected by I. LÖBL and co-workers of the Muséum d'histoire naturelle, Genève, at many localities in Nepal, Sikkim, and Assam. The paper included, however, also samples collected by J. MARTENS, and J. MARTENS & W. SCHAWALLER in Nepal. Now additional samples from Nepal are available, collected recently by W. SCHAWALLER of the Staatliches Museum für Naturkunde, Stuttgart. These samples again include four new species that are described herein.

This paper is rendered a supplement to my revision. Measurements and technics were conducted in the same way as in that paper.

2. Acknowledgement

My sincere thanks are due to Dr. W. SCHAWALLER (Stuttgart) for the kind loan of the most interesting sample.

3. Deposition of types

The holotypes of the new species and a part of the paratypes are deposited in the Staatliches Museum für Naturkunde, Stuttgart (SMNS). Where available, paratypes are also deposited in the working collection of the author at the Zoologische Staatssammlung, München (CBM).

4. Characters

The best characters for the differentiation of species in the genus *Gunvorita* are the male genitalia that exhibit remarkably different shapes and structures. All species described so far, and also the new species may be immediately recognized by their characteristic aedeagi. Nevertheless, body shape, especially shape of head, size of eyes in combination with shape of orbits, shape of pronotum and relative length of elytra, also are rather good discriminating characters, as are the degree of puncturation and the pilosity of the surface. These latter non-genitalic characters are particularly important for the differentiation of females, because the female genitalia, especially the stylomeres, are extremely constant within the whole genus and do not allow a reasonable distinction of species.

5. Genus *Gunvorita* Landin

LANDIN, 1955: 467, fig. 90.

An extensive diagnosis and complete citation of the relevant literature was given in my revision (BAEHR 1998).

5.1. *Gunvorita globipalpis*, sp. n. (Figs 1, 5, 9, 13)

Holotype (♂): 536 Nepal: Bhojpur Distr. Valley NW Phedi, 1900 m, 25. V. 1995 leg. W. SCHAWALLER (SMNS).

Paratypes: 2 ♂♂, 1 ♀, same data (CBN, SMNS).

Etymology: The name refers to the large, rounded labial palpi of this species.

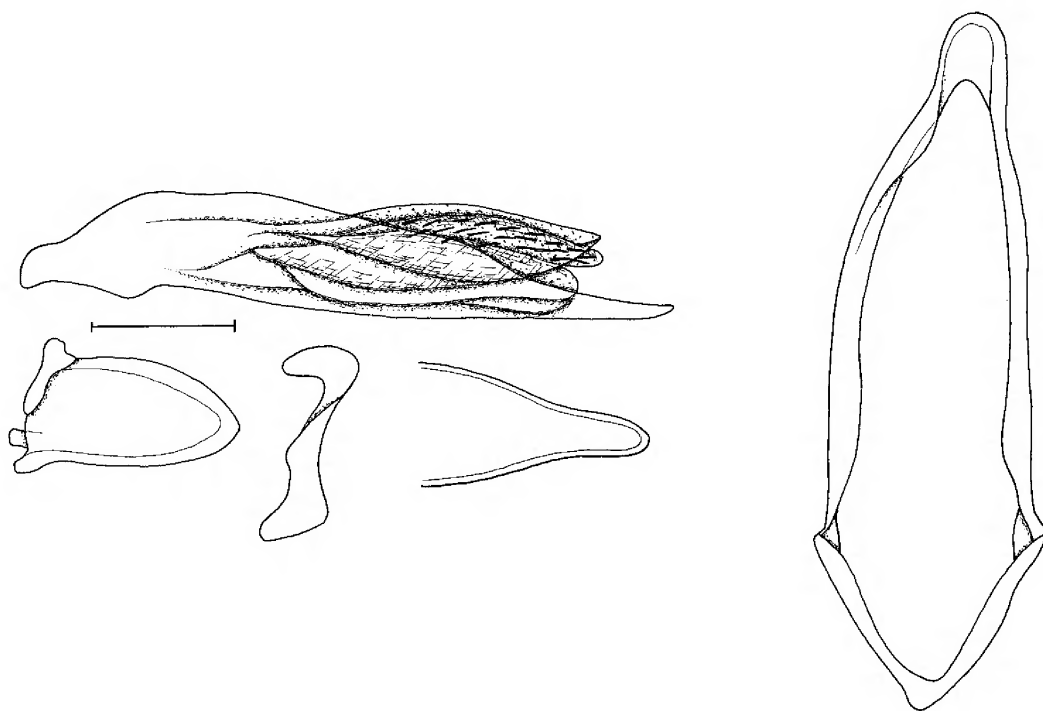


Fig.1. *Gunvorita globipalpis*, sp. n. ♂ genitalia: aedeagus (left side), shape of apex (from below), left and right parameres, genital ring. – Scale: 0.25 mm.

Diagnosis: Rather small species with posteriorly widened, fairly triangular head, further distinguished by the shape of the aedeagus with elongate, straight apical part lacking a crotchet.

Description: Measurements. Length: 3.7–4.1 mm; width: 1.30–1.45 mm. Ratios. Length/width of head: 1.37–1.39; length orbit/eye: 3.9–4.0; length/width of pronotum: 1.24–1.27; width widest part/base of pronotum: 1.66–1.72; width pronotum/head: 0.97–0.98; length/width of elytra: 1.47–1.49; width elytra/pronotum: 2.05–2.15.

Colour. Dark piceous, labrum, palpi, legs, and antennae yellowish.

Head (Fig. 9). Comparatively short, posteriorly considerably widened, fairly triangular, widest near base, orbit posteriorly shortly rounded off. Upper surface gently convex. Eyes small, depressed, length c. 1/4 of orbit length to beginning of curvature. Clypeus anteriorly slightly convex, surface in middle convex, uneven, lateral angles (above base of antenna) distinctly projecting. Clypeal seta far removed from apex, at apex on either side two hairs. Clypeal suture postero-laterally with a large, deep groove each side. Frons convex, between eyes with a shallow, circular, slightly oblique groove on either side. Labrum anteriorly barely excised, 6-setose, inner 4 setae shorter, lateral margin rather sparsely pilose. Mandibles short, at apex sharply incurved. Mentum with short and wide, triangular tooth. Labium anteriorly concave. Maxillary palpus rather short, apex obliquely cut. Terminal segment of labial palpus large but comparatively short. Antenna rather short, barely attaining middle of pronotum. Median antennomeres as long as wide, 3rd antennomere < 2/3 as long as 1st, slightly longer than 2nd antennomere. Surface glossy, with traces of microreticulati-

on only on clypeus. Puncturation sparse, very fine and superficial, distance between punctures c. 5 x as wide as diameter of punctures. Pilosity sparse, elongate, hirsute, erect, inclined anteriorly. Both supraorbital setae elongate, though not much longer than pilosity, posterior supraorbital setae situated far behind eye at base of head.

Pronotum (Fig. 13). Moderately elongate, fairly cordiform, considerably longer than wide, slightly narrower than head, widest in anterior third. Upper surface markedly convex. Lateral margin convex in anterior two thirds, gently sinuate in front of posterior angles. Apex fairly wide, slightly excised, anterior angles obtuse, slightly projecting. Base narrow, laterally oblique but not excised, basal angles slightly projecting, obtuse. Lateral margin rather inconspicuous, without distinct border line, marginal channel absent. Median line fine, not impressed. Prebasal grooves almost absent. Anterior marginal seta elongata, situated at anterior third of pronotum, posterior marginal seta shorter, situated right on basal angle. Surface without microreticulation, glossy, with moderately sparse, coarse puncturation. Distance between punctures c. 1.5 x as wide as diameter of punctures. Pilosity moderately sparse, elongate, hirsute, irregularly inclined, though generally rather erect.

Elytra (Fig. 5). Fairly wide, triangular, laterally slightly curved, widest in posterior third, upper surface moderately convex, at base distinctly raised. Shoulders narrow, oblique, not projecting. Apex wide, very faintly sinuate, slightly oblique, not redressed to suture. Striae irregularly marked by rows of punctures, puncturation rather sparse, coarse, rather irregular, in apical and lateral parts punctures slightly finer. Fixed setae on third interval hardly recognizable within the coarse puncturation. Series of marginal pores very difficult to detect when setae broken, consisting of 8 basal, 3 postmedian, 6 apical pores, and 1 pore at apex of 3rd stria. Setae very elongate. Surface without microreticulation, glossy. Pilosity rather sparse, rather elongate, hirsute, irregular, inclined posteriorly, fairly depressed.

Male genitalia (Fig. 1). Genital ring very narrow, elongate, evenly narrowed towards apex, with fairly wide apical plate, slightly asymmetric. Aedeagus very elongate, straight, fairly narrow, barely curved near base, with straight, elongate apex devoid of any crotchet or tooth. Apex slightly spatulate seen from below. Lower surface very gently convex. Internal sac in middle with large, coiled, denticulate sclerite. For parameres see fig. 1, left paramere rather elongate, with rounded triangular tip.

Female genitalia. Stylomere 2 narrow and elongate with acute apex, with 2 elongate ventro-lateral ensiform setae the lower one being slightly shorter, one elongate dorsomedian ensiform seta, and a nematiform seta situated in a large groove in middle between base and apex. Apex of stylomere 1 medially with 1 nematiform seta.

Variation. Apart from some differences in size and relative shape of pronotum and elytra little variation noted.

Distribution: Eastern Nepal. Known only from type locality.

Collecting circumstances: Most probably the specimens were collected by sifting soil and leaf litter.

Relationships: According to the structure of aedeagus, this species is nearest related to *G. besucheti* Baehr, *G. minor* Baehr, both from Northeast India, and *G. distinguenda*, sp. n. from Nepal.

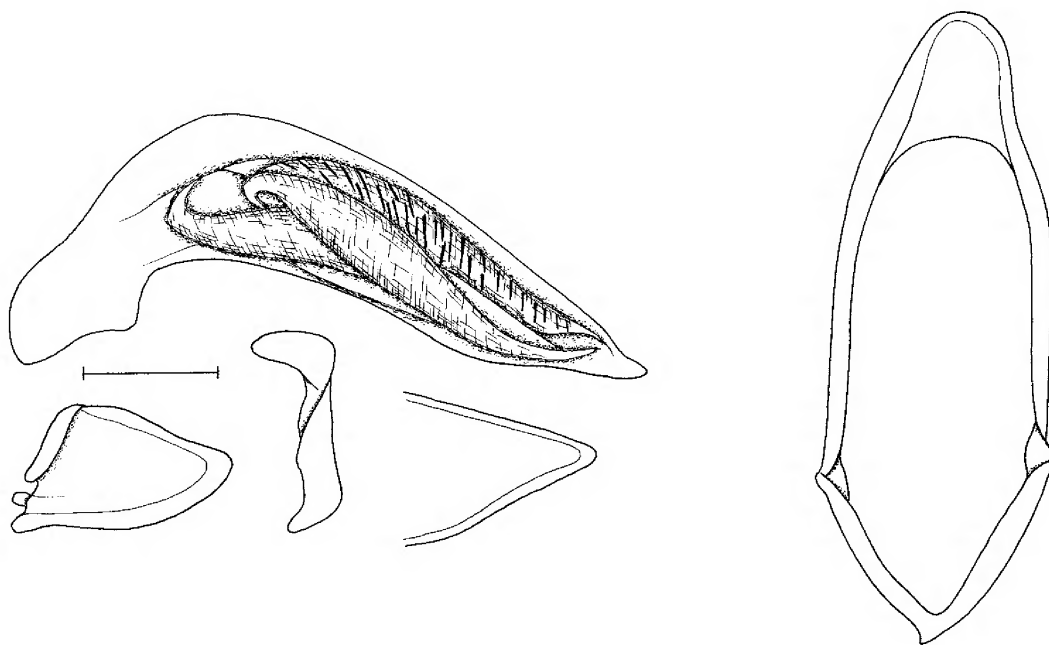


Fig. 2. *Gunvorita apicalis*, sp. n. ♂ genitalia. – For legend see Fig. 1.

5.2. *Gunvorita apicalis*, sp. n. (Figs 2, 6, 10, 14)

Holotype (♂): 525 Nepal: Solokhumbu Distr. Hinku Drangka Khola bridge, 2000 m, 18.–19. V. 1997 leg. W. SCHAWALLER (SMNS).

Paratype: 1 ♂, same data (CBM).

Etymology: The name refers to the markedly triangular apex of the aedeagus.

Diagnosis: Medium sized species with posteriorly widened, slightly rhomboidal head, distinguished by the shape of the aedeagus with short, triangular apex lacking a crotchet, and very elongate, denticulate part of inner sac.

Description: Measurements. Length: 4.7–4.8 mm; width: 1.60–1.65 mm. Ratios. Length/width of head: 1.45–1.46; length orbit/eye: 3.5–3.6; length/width of pronotum: 1.21–1.23; width widest part/base of pronotum: 1.78–1.81; width pronotum/head: 1.09–1.10; length/width of elytra: 1.48; width elytra/pronotum: 2.06–2.09.

Colour. Very dark piceous, almost black, labrum, palpi, legs, and antennae yellowish.

Head (Fig. 10). Comparatively short, posteriorly considerably widened, though not triangular, widest a distance from base, orbits posteriorly rather oblique. Upper surface gently convex. Eyes small, depressed, length c. 1/3 of orbit length to beginning of curvature. Clypeus anteriorly slightly convex, surface in middle convex, uneven, lateral angles (aboves base of antenna) distinctly projecting. Clypeal seta far removed from apex, at apex on either side two hairs. Clypeal suture postero-laterally with a large, deep groove each side. Frons convex, between eyes with a shallow, circular, slightly oblique groove on either side. Labrum anteriorly barely excised, 6-setose, inner 4 setae shorter, lateral margin rather sparsely pilose. Mandibles short, at apex sharply incurved. Mentum with short and wide, triangular tooth. Labium ante-

riorly concave. Maxillary palpus rather short, apex obliquely cut. Terminal segment of labial palpus large and elongate. Antenna rather short, attaining middle of pronotum. Median antennomeres about as long as wide, 3rd antennomere $< 2/3$ as long as 1st, slightly longer than 2nd antennomere. Surface glossy, with traces of microreticulation only on clypeus. Puncturation sparse, very fine and superficial, distance between punctures c. 4–5 x as wide as diameter of punctures. Pilosity sparse, elongate, hirsute, erect, inclined anteriorly. Both supraorbital setae elongate, though not much longer than pilosity, posterior supraorbital setae situated far behind eye near base of head.

Pronotum (Fig. 14). Moderately elongate, fairly cordiform, considerably longer than wide, wider than head, widest in anterior third. Upper surface markedly convex. Lateral margin convex in anterior two thirds, gently sinuate in front of posterior angles. Apex fairly wide, slightly excised, anterior angles obtuse, slightly projecting. Base narrow, laterally oblique but not excised, basal angles slightly projecting, obtuse. Lateral margin rather inconspicuous, without distinct border line, marginal channel absent. Median line fine, not impressed. Prebasal grooves almost absent. Anterior marginal seta elongate, situated at anterior third of pronotum, posterior marginal seta shorter, situated right on basal angle. Surface without microreticulation, glossy, with moderately sparse, coarse puncturation. Distance between punctures c. 1.5 x as wide as diameter of punctures. Pilosity moderately sparse, elongate, hirsute, irregularly inclined, though rather erect.

Elytra (Fig. 6). Fairly wide, triangular, laterally slightly curved, widest in posterior third, upper surface moderately convex, at base distinctly raised. Shoulders narrow, oblique, not projecting. Apex wide, very faintly convex, transverse, very slightly redressed to suture. Striae irregularly marked by rows of punctures, puncturation rather sparse, coarse, rather irregular, in apical and lateral parts punctures slightly finer. Fixed setae on third interval hardly recognizable within the coarse puncturation. Series of marginal pores very difficult to detect when setae broken, consisting of 8 basal, 3 postmedian, 6 apical pores, and 1 pore at apex of 3rd stria. Setae very elongate. Surface without microreticulation, glossy. Pilosity rather sparse, rather elongate, hirsute, irregular, inclined posteriorly, fairly depressed.

Male genitalia (Fig. 2). Genital ring narrow, elongate, almost parallel, with wide apical plate, almost symmetric. Aedeagus moderately elongate, straight, wide, markedly curved near base, with short apex devoid of any crotch or tooth. Apex narrowly triangular seen from below. Lower surface basally concave, then markedly convex. Internal sac in middle with very large, coiled, denticulate sclerite. For parameres see fig. 2, left paramere rather short, with rounded triangular tip.

Female genitalia. Unknown.

Variation. Little variation noted.

Distribution: Eastern Nepal. Known only from type locality.

Collecting circumstances: Most probably the specimens were collected by sifting soil and leaf litter.

Relationships: According to the structure of aedeagus, this species is rather isolated, though its nearest relatives might be *G. besucheti* Baehr, *G. minor* Baehr, both from Northeast India, and *G. globipalpis*, sp. n. and *G. distinguenda*, sp. n., both from Nepal.

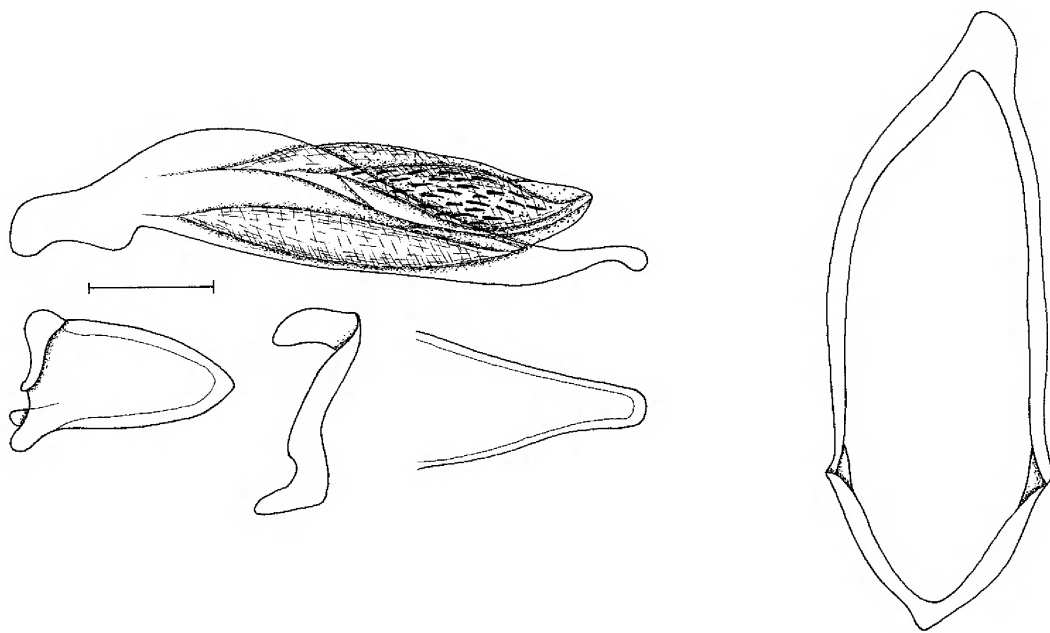


Fig. 3. *Gunvorita distinguenda*, sp. n. ♂ genitalia. – For legend see Fig. 1.

5.3. *Gunvorita distinguenda*, sp. n. (Figs 3, 7, 11, 15)

Holotype (♂): 539 Nepal: Bhojpur Distr. Dilkharka, 2100 m, 26. V. 1997, leg. W. SCHAWALLER (SMNS).

Paratype: 1 ♂, same data (CBM).

Etymology: The name refers to the high-grade similarity of the aedeagus of this species compared with *G. besucheti* Baehr and *G. globipalpis*, sp. n.

Diagnosis: Medium sized species with posteriorly widened, evenly rounded head, further distinguished by the shape of the aedeagus with elongate, sinuate, at tip slightly club-shaped apical part lacking a crotched.

Description: Measurements. Length: 4.7 mm; width: 1.55–1.60 mm. Ratios. Length/width of head: 1.57–1.58; length orbit/eye: 3.6–3.7; length/width of pronotum: 1.27–1.29; width widest part/base of pronotum: 1.67–1.71; width pronotum/head: 1.05–1.08; length/width of elytra: 1.49–1.50; width elytra/pronotum: 1.96–2.12.

Colour. Dark piceous, labrum, palpi, legs, and antennae yellowish.

Head (Fig. 11). Comparatively elongate, posteriorly considerably widened, ovalish, widest near base, orbits posteriorly evenly rounded off. Upper surface gently convex. Eyes small, depressed, length c. 1/3 of orbit length to beginning of curvature. Clypeus anteriorly slightly convex, surface in middle convex, uneven, lateral angles (above base of antenna) distinctly projecting. Clypeal seta far removed from apex, at apex on either side two hairs. Clypeal suture postero-laterally with a large, deep groove each side. Frons convex, between eyes with a shallow, circular, slightly oblique groove on either side. Labrum anteriorly barely excised, 6-setose, inner 4 setae shorter, lateral margin rather sparsely pilose. Mandibles short, at apex sharply incurved. Mentum with short and wide, triangular tooth. Labium anteriorly concave.

Maxillary palpus rather short, apex oblique cut. Terminal segment of labial palpus large and rather elongate. Antenna rather short, attaining middle of pronotum. Median antennomeres about as long as wide, 3rd antennomere c. 2/3 as long as 1st, slightly longer than 2nd antennomere. Surface glossy, with traces of microreticulation only on clypeus. Puncturation sparse, very fine and superficial, distance between punctures c. 4–5 x as wide as diameter of punctures. Pilosity sparse, elongate, hirsute, erect, inclined anteriorly. Both supraorbital setae elongate, though not much longer than pilosity, posterior supraorbital setae situated far behind eye at base of head.

Pronotum (Fig. 15). Moderately elongate, fairly cordiform, considerably longer than wide, slightly wider than head, widest in anterior third. Upper surface markedly convex. Lateral margin convex in anterior two thirds, gently sinuate in front of posterior angles. Apex fairly wide, slightly excised, anterior angles obtuse, slightly projecting. Base narrow, laterally oblique but not excised, basal angles slightly projecting, obtuse. Lateral margin rather inconspicuous, without distinct border line, marginal channel absent. Median line fine, not impressed. Prebasal grooves almost absent. Anterior marginal seta elongate, situated at anterior third of pronotum, posterior marginal seta shorter, situated right on basal angle. Surface without microreticulation, glossy, with moderately sparse, fairly coarse puncturation. Distance between punctures c. 2 x as wide as diameter of punctures. Pilosity moderately sparse, elongate, hirsute, irregularly inclined, though rather erect.

Elytra (Fig. 7). Fairly wide, triangular, laterally slightly curved, widest in posterior third, upper surface moderately convex, at base distinctly raised. Shoulders narrow, oblique, not projecting. Apex wide, straight, transverse, not redressed to suture. Striae irregularly marked by rows of punctures, puncturation rather sparse, coarse, remarkably irregular, in apical and lateral parts punctures slightly finer. Fixed setae on third interval hardly recognizable within the coarse puncturation. Series of marginal pores very difficult to detect when setae broken, consisting of 8 basal, 3 postmedian, 6 apical pores, and 1 pore at apex of 3rd stria. Setae very elongate. Surface without microreticulation, glossy. Pilosity rather sparse, rather elongate, hirsute, irregular, inclined posteriorly, fairly depressed.

Male genitalia (Fig. 3). Genital ring rather narrow, elongate, absolutely parallel, with fairly wide apical plate, asymmetric. Aedeagus very elongate, straight, fairly narrow, barely curved near base, with straight, elongate apex devoid of any crotched or tooth, but slightly club-shaped at the very tip. Apex slightly spatulate seen from below. Lower surface gently convex, near apex concave. Internal sac in middle with large, coiled, denticulate sclerite. For parameres see fig. 3, left paramere rather elongate, with markedly rounded, triangular tip.

Female genitalia. Unknown.

Variation. Apart from some minor variation in relative width of pronotum and elytra little variation noted.

Distribution: Eastern Nepal. Known only from type locality,

Collecting circumstances: Most probably the specimens were collected by sifting soil and leaf litter.

Relationships: According to the structure of aedeagus, this species is nearest related to *G. besucheti* Baehr, *G. minor* Baehr, both from Northeast India, and *G. globipalpis*, sp. n. from Nepal.

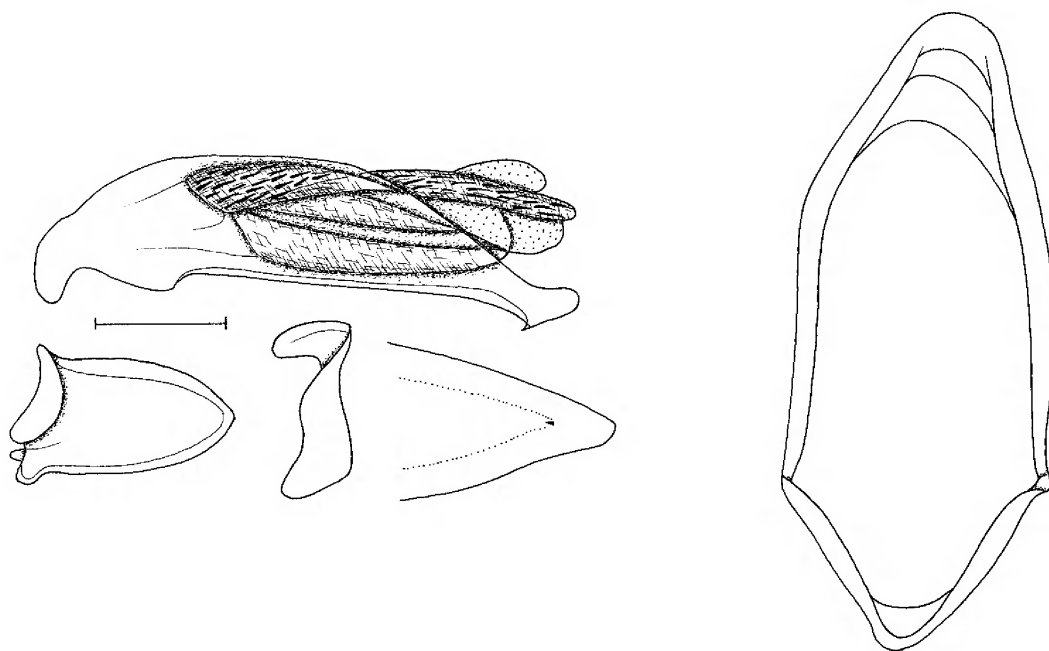


Fig. 4. *Gunvorita denticulata*, sp. n. ♂ genitalia. – For legend see Fig. 1.

5.4. *Gunvorita denticulata*, sp. n. (Figs 4, 8, 12, 16)

Holotype (♂): 536 Nepal: Bhojpur Distr. Valley NW Phedi, 1900 m, 25. V. 1995 leg. W. SCHAWALLER (SMNS).

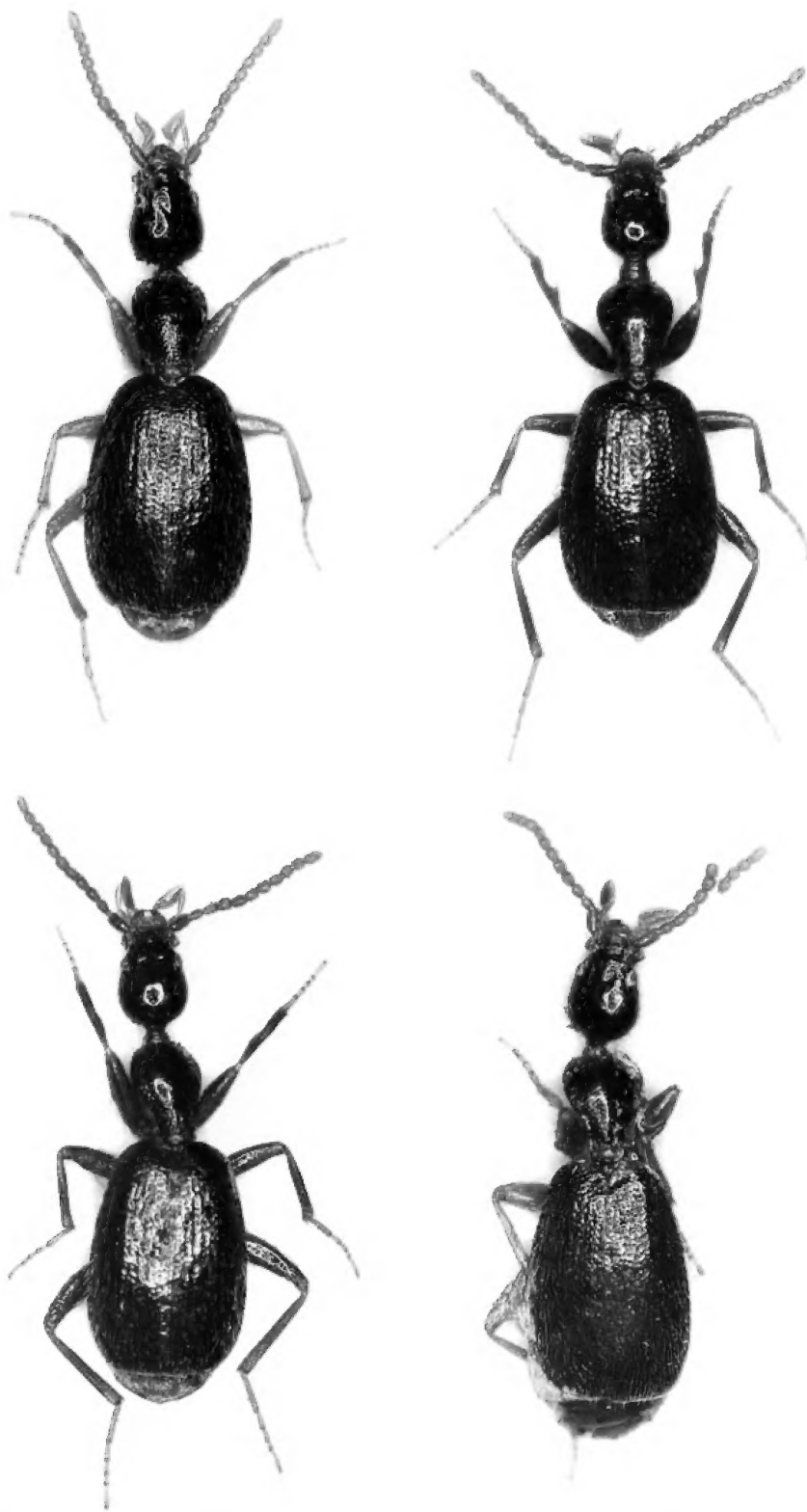
Etymology: The name refers to the presence of a tiny crotchet or denticle near apex of the aedeagus.

Diagnosis: Easily recognizable by the presence of a tiny crotchet on the aedeagus, that is far removed from the very apex, and by two indistinct, punctulate ridges on lower surface behind that crotchet.

Description: Measurements. Length: 4.4 mm; width: 1.55 mm. Ratios. Length/width of head: 1.58; length orbit/eye: 3.9; length/width of pronotum: 1.24; width widest part/base of pronotum: 1.69; width pronotum/head: 1.11; length/width of elytra: 1.53; width elytra/pronotum: 2.0.

Colour. Dark piceous, labrum, palpi, legs, and antennae yellowish.

Head (Fig. 12). Comparatively elongate, posteriorly considerably widened, ovalish, widest near base, orbits posteriorly evenly rounded off. Upper surface gently convex. Eyes small, depressed, length slightly $< 1/4$ of orbit length to beginning of curvature. Clypeus anteriorly slightly convex, surface in middle convex, uneven, lateral angles (above base of antenna) distinctly projecting. Clypeal seta far removed from apex, at apex on either side two hairs. Clypeal suture postero-laterally with a large, deep groove each side. Frons convex, between eyes with a shallow, circular, slightly oblique groove on either side. Labrum anteriorly barely excised, 6-setose, inner 4 setae shorter, lateral margin rather sparsely pilose. Mandibles short, at apex sharply incurved. Mentum with short and wide, triangular tooth. Labium anteriorly concave. Maxillary palpus rather short, apex obliquely cut. Terminal segment of labial palpus large and elongate. Antenna rather short, attaining middle of pronotum.



Figs 5–8. Entire view. – 5. *Gunvorita globipalpis*, sp. n. (above, left side); – 6. *G. apicalis*, sp. n.; – 7. *G. distinguenda*, sp. n.; – 8. *G. denticulata*, sp. n. (below, right side). – Lengths: 3.7 mm; 4.7 mm; 4.7 mm; 4.4 mm.

Median antennomeres about as long as wide, 3rd antennomere $< 2/3$ as long as 1st, slightly longer than 2nd antennomere. Surface glossy, with traces of microreticulation only on clypeus. Puncturation sparse, very fine and superficial, distance between punctures c. 4–5 x as wide as diameter of punctures. Pilosity sparse, elongate, hirsute, erect, inclined anteriorly. Both supraorbital setae elongate, though not much longer than pilosity, posterior supraorbital setae situated far behind eye at base of head.

Pronotum (Fig. 16). Comparatively short, fairly cordiform, considerably longer than wide, wider than head, widest in anterior third. Upper surface markedly convex. Lateral margin convex in anterior two thirds, gently sinuate in front of posterior angles. Apex fairly wide, slightly excised, anterior angles obtuse, slightly projecting. Base narrow, laterally oblique but not excised, basal angles slightly projecting, obtuse. Lateral margin rather inconspicuous, without distinct border line, marginal channel absent. Median line fine, not impressed. Prebasal grooves almost absent. Anterior marginal seta elongate, situated at anterior third of pronotum, posterior marginal seta shorter, situated right on basal angle. Surface without microreticulation, glossy, with fairly dense, coarse puncturation. Distance between punctures barely wider than diameter of punctures. Pilosity moderately sparse, elongate, hirsute, irregularly inclined, though rather erect.

Elytra (Fig. 8). Fairly wide, triangular, laterally slightly curved, widest in posterior third, upper surface moderately convex, at base distinctly raised. Shoulders narrow, oblique, not projecting. Apex wide, faintly convex, transverse, slightly redressed to suture. Striae irregularly marked by rows of punctures, puncturation rather sparse, coarse, irregular, in apical and lateral parts punctures slightly finer. Fixed setae on third interval hardly recognizable within the coarse puncturation. Series of marginal pores very difficult to detect when setae broken, consisting of 8 basal, 3 postmedian, 6 apical pores, and 1 pore at apex of 3rd stria. Setae very elongate. Surface without microreticulation, glossy. Pilosity rather sparse, rather elongate, hirsute, irregular, inclined posteriorly, fairly depressed.

Male genitalia (Fig. 4). Genital ring comparatively wide, ovalish, with large apical plate, barely asymmetric. Aedeagus rather short and stout, with stout, moderately elongate, markedly upturned apical part that bears a small crotchet far behind apex. Apex moderately wide seen from below. Lower surface almost straight, behind crotchet with two indistinct, punctulate ridges. Internal sac in apical half on right side, and in basal half on left side with a large, coiled, strongly dentate sclerite each. Both parameres very large, see fig. 4.

Female genitalia. Unknown.

Variation. Unknown.

Distribution: Eastern Nepal. Known only from type locality.

Collecting circumstances: Most probably the specimens were collected by sifting soil and leaf litter.

Relationships: According to the structure of aedeagus, this species is nearest related to *G. smetanai* Baehr from Nepal.



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Figs 9–12. Head. – 9. *Gunvorita globipalpis*, sp. n.; – 10. *G. apicalis*, sp. n.; – 11. *G. distinguenda*, sp. n.; – 12. *G. denticulata*, sp. n.

Figs 13–16. Prothorax. – 13. *Gunvorita globipalpis*, sp. n.; – 14. *G. apicalis*, sp. n.; – 15. *G. distinguenda*, sp. n.; – 16. *G. denticulata*, sp. n.

6. Appendix

Because measurements and ratios are rather useful in species differentiation, the used ratios for the new *Gunvorita* species are compiled in the following table that can be combined with a comparable table in my revision (BAEHR 1998, tab. 1).

7. Recognition

Because males are available of all four new species, identification of the species is rather easy with aid of the figures of the aedeagi as given in my recent revision (BAEHR 1998). The aedeagi of all described species of *Gunvorita* are so characteristic that hardly mistakes are possible when the figures are carefully compared. However, identification of females is difficult, unless they are associated with males, because many species are very similar in certain external characters. Hence, whenever females can be associated with males, male genitalia should be examined. In particular distinction of the females mentioned in captions 34–40 is extremely difficult.

For the benefit of the user a complete new key to all known species of *Gunvorita* is given here that replaces the key in my recent revision. The published figures of the yet described species are of great value for the identification, hence, in the key the numbers of the respective figures have been added under the following chiffies: **L55**: LANDIN (1955); **D68**: DARLINGTON (1968); **M81**: MATEU (1981); **C85** CASALE (1985); **B98**: BAEHR (1998). For a valuable identification, therefore, the reader should use both, this key and and the figures in the revision.

- | | | |
|---|---|------------------------|
| 1 | ♂ ♂ | 2 |
| – | ♀ ♀ | 22 |
| 2 | Apex of aedeagus with crotchet at lower side, doubtful species under both couplets (M81 fig. 7; C85 fig. 2; B98 figs 1–9; Fig. 4) | 3 |
| – | Apex of aedeagus without crotchet at lower side (B98 figs 10–14; Figs 1–3) | 14 |
| 3 | Head posteriorly markedly widened, rather triangular (L55 fig. 90; M81 fig. 4; C85 fig. 1; B98 figs 37–40) and smaller species, length < 4.5 mm and apical third of aedeagus distinctly bent up (M81 fig. 7; C85 fig. 2; B98 figs 1, 2) | 4 |
| – | Head posteriorly widely rounded off (B98 figs 41–47); usually larger species, length mostly > 4.5 mm; apical third of aedeagus not distinctly bent up (B98 figs 3–9); if in doubt of the latter, species >5 mm long | 7 |
| 4 | Eyes smaller in comparison to orbits (C85 fig. 1; B98 fig. 38); aedeagus with remarkably slender apical part, apex semicircular, with minute denticle on lower side (C85 fig. 2). Eastern Nepal | <i>martensi</i> Casale |
| – | Eyes larger in comparison to orbits (L55 fig. 90; B98 figs 37, 39–40); aedeagus with less slender apical part, apex not semicircular, with distinct crotchet (M81 fig. 7; B98 figs 1, 2) | 5 |
| 5 | Head markedly widened posteriorly, strongly triangular (B98 fig. 40); lower surface of aedeagus with characteristic edge in middle, internal sac with short sclerotized area (B98 fig. 2). Northeastern India | <i>inermis</i> Baehr |
| – | Head less widenes posteriorly, less triangular (M81 fig. 4; B98 figs 37, 39); lower surface of aedeagus without edge in middle, internal sac with elongate sclerotized area (M81 fig. 7; B98 fig. 1) | 6 |
| 6 | Aedeagus elongate, apex more delicate, apical third suddenly turned upwards, upper margin of apex not markedly upturned (B98 fig. 1); puncturation of head very fine and sparse. Northeastern India | <i>laeviceps</i> Baehr |
| – | Aedeagus shorter, apex shorter, stouter, less distinctly turned upwards, upper margin of | |

- apex distinctly upturned (M81 fig. 7); puncturation of head coarser and denser. Eastern Nepal, Sikkim, northeastern India *elegans* Landin
- 7 Crotchet situated immediately at apex of aedeagus (B98 figs 3–7); eyes slightly smaller, orbit >3.5 x as long as eye (B98 figs 41–45) 8
- Crotchet considerably removed from apex of aedeagus (B98 figs 8–9); eyes slightly larger, orbit <3.5 x as long as eye (B98 figs 46–47) 12
- 8 Aedeagus markedly short and stout, with very elongate crotchet (B98 fig. 7); size small, length <4.3 mm; for further discrimination: eyes smaller, orbit >3.75 x as long as eye (B98 fig. 45) and elytra slightly narrower, ratio l/w <1.96 (B98 fig. 29). Eastern Nepal *schawalleri* Baehr
- Aedeagus longer and narrower, with shorter crotchet (B98 figs 3–6); size larger, usually >4.5 mm, except for small specimens of *hamifera* Baehr; for further discrimination: length >4.3 mm and eyes larger, orbit <3.75 x as long as eye (B98 fig. 44) and elytra slightly wider, ratio l/w >1.96 (B98 fig. 28) 9
- 9 Head elongate, posteriorly markedly oval-shaped, ratio l/w >1.6 (B98 figs 41–42); apex of aedeagus somewhat upturned (B98 figs 3–4). Northeastern India 10
- Head shorter, posteriorly shortly rounded, ratio l/w <1.6 (B98 figs 43–44); apex of aedeagus barely upturned (B98 figs 5–6). Nepal 11
- 10 Larger species, length 5.65 mm; head longer and narrower, ratio l/w 1.78 (B98 fig. 41); prothorax wider, ratio l/w 1.23 (B98 fig. 57); aedeagus longer and more delicate (B98 fig. 3) *indica* Darlington
- Smaller species, length 5.05 mm; head shorter and wider, ratio l/w 1.61 (B98 fig. 42); prothorax narrower, ratio l/w 1.31 (B98 fig. 58); aedeagus shorter and stouter (B98 fig. 4) *ovaliceps* Baehr
- 11 Head longer and narrower with smaller eyes, ratio l/w of head 1.51–1.60 (B98 fig. 43); elytra shorter, ratio l/w 1.38–1.44, wider in relation to prothorax (B98 fig. 27); aedeagus with shorter crotchet and with one elongate, coiled, denticulate sclerite (B98 fig. 5). Central Nepal *nepalensis* Baehr
- Head shorter and wider with larger eyes, ratio l/w of head 1.42–1.47 (B98 fig. 44); elytra longer, ratio l/w 1.53–1.55, narrower in relation to prothorax (B98 fig. 28); aedeagus with longer crotchet and with two narrow, denticulate sclerites (B98 fig. 6). Eastern Nepal *hamifera* Baehr
- 12 Tip of apex of aedeagus wide, upturned, lower part of apex oblique, straight, crotchet on level with lower margin of apex (B98 fig 8; Fig. 4); elytra >2 x as wide as prothorax. 13
- Tip of apex of aedeagus not wide, barely upturned, lower part of apex convex, apex and crotchet form a distinct angle (B98 fig. 9); elytra <1.9 x as wide as prothorax. Eastern Nepal *uncinata* Baehr
- 13 Larger species, length c. 5 mm; head more parallel (B98 fig. 46); apex of aedeagus longer, crotchet elongate (B98 fig. 8). Central Nepal *smetanai* Baehr
- Smaller species, length c. 4.4 mm; head posteriorly more widened (Fig. 12); apex of aedeagus shorter, crotchet tiny (Fig. 4). Eastern Nepal *denticulata*, sp. n.
- 14 Aedeagus with remarkably slender apical part, apex semicircular, with minute denticle on lower side (C85 fig. 2). Eastern Nepal *martensi* Casale
- Aedeagus without any denticle on lower side of apex, apical part not remarkably slender (B98 figs 10–14; Figs 1–3) 15
- 15 Apex of aedeagus distinctly curved down, or at least with a distinct sinuosity before apex; apex wide or slightly club-shaped as seen from below (B98 figs 13–14; Fig. 3) 16
- Apex of aedeagus straight of faintly curved up, narrow and acute as seen from below (B98 figs 10–12; Figs 1–2) 18
- 16 Head longer and narrower, posteriorly markedly ovalish (B98 fig. 36); aedeagus as figured in B98 fig. 14. Eastern Nepal *angusticeps* Baehr
- Head shorter and wider, posteriorly more shortly rounded (B98 fig. 35; Fig. 11); aedeagus as in B98 fig. 13 or in Fig. 3 17

- 17 Eyes larger, orbit $<2.7 \times$ as long as eye (B98 fig. 35); aedeagus shorter and stouter, apex slightly club-shaped as seen from below (B98 fig. 13). Northeastern India *depressipennis* Baehr
- Eyes smaller, orbit $>3.8 \times$ as long as eye (Fig. 11); aedeagus longer and more delicate, apex wide as seen from below (Fig. 3). Eastern Nepal. *distinguenda*, sp. n.
- 18 Larger species, length >4.7 mm; head posteriorly rather ovalish (B98 fig. 48; Fig. 10) 19
- Smaller species, length <4.1 mm; head posteriorly more shortly rounded (B98 figs 49–50; Fig. 9) 20
- 19 Aedeagus narrow and elongate, apex elongate (B98 fig. 10); head longer, ratio l/w >1.58 , and posteriorly more pentagonal (B98 fig. 48). Northeastern India ... *besucheti* Baehr
- Aedeagus shorter and stouter, apex short (Fig. 2); head shorter, ratio l/w <1.46 , and posteriorly less pentagonal (Fig. 10). Eastern Nepal *apicalis*, sp. n.
- 20 Aedeagus with elongate, denticulate sclerite (B98 fig. 11; Fig. 1); head posteriorly rather evenly rounded (B98, fig. 49; Fig. 9) 21
- Aedeagus with short, denticulate sclerite (B98 fig. 12); head posteriorly shortly rounded, trapezoidal (B98, fig. 50). Eastern Nepal *punctipennis* Baehr
- 21 Apex of aedeagus longer, wider and convex seen from below (Fig. 1); eyes smaller, ratio length orbit/eye >3.9 (Fig. 9); elytra shorter and wider, ratio l/w <1.5 (Fig. 5). Eastern Nepal *globipalpis*, sp. n.
- Apex of aedeagus shorter, narrower and acute seen from below (B98 fig. 11); eyes larger, ratio length orbit/eye <2.7 (B98 fig. 49); elytra longer and narrower, ratio l/w >1.55 (B98 fig. 33). Northeastern India, Khasi Hills *minor* Baehr
- 22 Posterior part of head elongate, markedly oval-shaped, head rather pentagonal, comparatively narrow and elongate, ratio l/w >1.58 (B98 figs. 41–42, 48, 52); always rather large species, length >4.7 mm 23
- Posterior part of head either shortly rounded (B98 figs 43–47, 49, 51) or distinctly trapezoidal (L55 fig. 90; M81 fig. 4; C85 fig. 1; B98 figs. 37–40, 50), head not pentagonal, usually shorter and wider, ratio l/w <1.60 , commonly far less; mostly smaller species, length rarely up to 5.0 mm 26
- 23 Very large species, length 5.65 mm; prothorax comparatively short and wide, ratio l/w 1.23 (B98 fig. 57), ratio width pronotum/head 1.25 (B98 fig. 25). Northeastern India . . . *indica* Darlington
- Smaller species, length <5.3 mm; prothorax longer and narrower, ratio l/w >1.27 (B98 figs 58, 64, 68), ratio width pronotum/head <1.18 (B98 figs 26, 32, 36) 24
- 24 Eyes comparatively large, orbit $<3.25 \times$ as long as eye (B98 fig. 48). Northeastern India *besucheti* Baehr
- Eyes smaller, orbit $>3.75 \times$ as long as eye (B98 figs 42, 52) 25
- 25 Head longer and narrower, ratio l/w 1.77 (B98 fig. 52); pronotum longer and narrower, ratio l/w 1.38, with comparatively wide base, $<0.5 \times$ as wide as elytra (B98 figs 36, 68). Eastern Nepal *angusticeps* Baehr
- Head shorter and wider, ratio l/w 1.61 (B98 fig. 42); pronotum shorter and wider, ratio l/w 1.31, with comparatively narrower base, $>0.5 \times$ as wide as elytra (B98 figs 26, 58). Northeastern India *ovaliceps* Baehr
- 26 Posterior part of head considerably widened, head markedly trapezoidal (L55 fig. 90; M81 fig. 4; C85 fig. 1; B98 figs 37–40, 50; Fig. 9); small species, length always <4.5 mm 27
- Posterior part of head less widened, more or less widely rounded off, head not markedly trapezoidal (B98 figs 43–47, 49, 51); commonly larger species 32
- 27 Eyes comparatively small, orbit $>3.5 \times$ as long as eye (C85 fig. 1; B98 fig. 38; Fig. 9) 28
- Eyes slightly larger, orbit $<3.2 \times$ as long as eye (L55 fig. 90; M81 fig. 4; B98 figs 37, 39–40, 50) 29
- 28 Pronotum considerably wider than head, ratio width pronotum/head 1.09 (B98 fig. 22); eyes slightly larger, ratio orbit/eye <3.7 (B98 fig. 38). Eastern Nepal . . *martensi* Casale
- Pronotum slightly narrower than head, ratio pronotum/head <1.0 (Fig. 5); eyes slightly smaller, ratio orbit/eye >3.9 (Fig. 9). Eastern Nepal *globipalpis*, sp. n.

- 29 Eyes comparatively large, orbit slightly >2.5 x as long as eye (B98 fig. 50); whole surface, in particular elytra very coarsely punctate (B98 fig. 34). Eastern Nepal *punctipennis* Baehr
- Eyes smaller, orbit >3 x as long as eye (L55 fig. 90; M81 fig. 4; B98 figs 37, 39–40); surface less coarsely punctate (B98 figs 21, 23–24) 30
- 30 Head longer and narrower, ratio l/w >1.42 (B98 figs 39–40); prothorax longer and narrower, ratio l/w >1.23 (B98 figs 55–56); generally smaller species, length <4.25 mm 31
- Head shorter and wider, ratio l/w <1.36 (B98 fig. 37); prothorax shorter and wider, ratio l/w 1.17 (B98 fig. 53); generally larger species, length >4.25 mm. Eastern Nepal, Sikkim, northeastern India *elegans* Landin
- 31 Slightly larger species, length >4.0 mm; elytra slightly shorter, ratio l/w <1.51 (B98 fig. 23); puncturation on head very sparse and fine (B98 fig. 39). Northeastern India *laeviceps* Baehr
- Slightly smaller species, length <3.9 mm; elytra slightly longer, ratio l/w >1.52 (B98 fig. 24); puncturation on head denser and coarser (B98 fig. 40). Northeastern India *inermis* Baehr
- 32 Eyes larger, orbit <2.75 x as long as eye (B98 figs 49, 51). Northeastern India 33
- Eyes smaller, orbit <3.33 x as long as eye (B98 figs 43–47). Nepal 34
- 33 Larger species, length >4.5 mm; pronotum slightly shorter and wider, ratio l/w <1.32 (B98 fig. 67); elytra markedly depressed, apical margin distinctly oblique and redressed towards suture (B98 fig. 35) *depressipennis* Baehr
- Smaller species, length 4.0 mm; pronotum slightly longer and narrower, ratio l/w 1.38 (B98 fig. 65); elytra less depressed, apical margin transverse, not redressed towards suture (B98 fig. 33) *minor* Baehr
- 34 Large species, length c. 5 mm and elytra elongate, ratio l/w >1.55 (B98 fig. 30) and head elongate and posteriorly rather narrow (B98 fig. 46). Central Nepal .. *smetanai* Baehr
- Commonly smaller species, though when length c. 5 mm, then elytra shorter, ratio l/w <1.5 (B98 fig. 27; fig. 6) and head shorter and posteriorly wider (B98 fig. 43; Fig. 10) .. 35
- 35 Elytra shorter, ratio l/w <1.44 (B98 fig. 27). Central Nepal *nepalensis* Baehr
- Elytra longer, ratio l/w >1.48 (B98 figs 44–45; Figs 6–8) 36
- 36 Head posteriorly more widely rounded, eyes smaller, ratio orbit/eye >3.5 (B98 figs 28–31; Figs 10–12) 37
- Head posteriorly more shortly rounded, eyes larger, ratio orbit/eye <3.45 (B98 fig. 47). Eastern Nepal *uncinata* Baehr
- 37 Head shorter, ratio l/w <1.50 (B98 figs 4–45; Fig. 10) 38
- Head longer, ratio l/w >1.57 (Figs 11–12) 40
- 38 Generally larger species, length >4.70 mm; elytra shorter, ratio l/w c. 1.48 and distinctly more than 2 x as wide as prothorax (Fig. 6). Eastern Nepal *apicalis*, sp. n.
- Generally smaller species, length <4.65 mm; elytra longer, ratio l/w >1.49 and barely 2 x as wide as prothorax (B98 figs 28–29) 39
- 39 Generally smaller species, length <4.3 mm; eyes slightly smaller, ratio orbit/eye >3.75 (B98 fig. 45); elytra distinctly less than 2 x as wide as prothorax (B98 fig. 39). Eastern Nepal *schawalleri* Baehr
- Generally larger species, length >4.3 mm; eyes slightly larger, ratio orbit/eye <3.75 (B98 fig. 44); elytra about 2 x as wide as prothorax (B98 fig. 28). Eastern Nepal *hamifera* Baehr
- 40 Slightly larger species, length c. 4.7 mm; elytra slightly shorter and wider, ratio l/w <1.5 (Fig. 7). Eastern Nepal *distinguenda*, sp. n.
- Slightly smaller species, length c. 4.4 mm; elytra slightly longer and narrower, ratio l/w >1.53 (Fig. 8). Eastern Nepal *denticulata*, sp. n.

Tab. 1. Measurement and ratios of the new species of the genus *Gunvorita*. – *Explications*: *L*. Length [in mm]; – *l/w h*. length/width of head; – *l o/e*. length of orbit/eye; – *l/w pr*. length/width of pronotum; – *w d/b*. width widest diameter/base of pronotum; – *w pr/h*. width of pronotum/head; – *l/w el*. length/width of elytra; – *w el/pr*. width of elytra/pronotum.

Species	<i>L</i>	<i>l/w h</i>	<i>l o/e</i>	<i>l/w pr</i>
<i>G. globipalpis</i>	3.7–4.1	1.37–1.39	3.9–4.0	1.24–1.27
<i>G. apicalis</i>	4.7–4.8	1.45–1.46	3.5–3.6	1.21–1.23
<i>G. distinguenda</i>	4.7	1.57–1.58	3.6–3.7	1.27–1.29
<i>G. denticulata</i>	4.4	1.58	3.9	1.24
	<i>w d/b</i>	<i>w pr/h</i>	<i>l/w el</i>	<i>w el/pr</i>
<i>G. globipalpis</i>	1.66–1.72	0.97–0.98	1.47–1.49	2.05–2.15
<i>G. apicalis</i>	1.78–1.81	1.09–1.10	1.48	2.06–2.09
<i>G. distinguenda</i>	1.67–1.71	1.05–1.08	1.49–1.50	1.96–2.12
<i>G. denticulata</i>	1.69	1.11	1.53	2.00

8. Remarks

The first species of the genus *Gunvorita* was described 45 years ago, but until my recent revision (BAEHR 1998) only two additional species were recorded. In the meantime the number of species was raised to 20 which is mainly due to the scrutinized and very successful sampling efforts of the collector groups of the Genève Museum (mainly Drs LÖBL, BESUCHET, BRUCKHARDT) in Nepal and northeastern India and of Prof. MARTENS (Mainz) and Dr. SCHAWALLER (Stuttgart) in Nepal. The history of research in the genus *Gunvorita* thus exactly mirrors the rapidly increasing entomological research in the southern parts of the Himalayas, in particular in Nepal, within the last 20 years. But it is mainly due to the mentioned collectors and their specialized collecting technics (sifting, Berlese extraction) that the number of species was so rapidly growing. Simple collecting by hand, as conducted by many other collectors, would have not yielded such most interesting results.

However, regarding the still rapidly growing number of detected species, certainly it is premature to begin any reasonable attempt of phylogenetic or even zoogeographic reasoning within the genus *Gunvorita*, beyond the rather generalized attempts at the generic level that I tried in my revision. Nevertheless, there are plenty of questions that could be discussed for example:

- Is the presence of the crotchet at the aedeagus a synapomorphic character state, or was it evolved several times within the genus?
- Is there a clear gradient toward reduction of the eyes, and has this reduction occurred several times within the genus?
- Are the ranges of the different species actually so localized as it seems at present?
- From where came the first stock of the genus *Gunvorita*?
- Did the ancestor of the genus immigrate from the southeast, via Burma, or did it reach its present range directly by continental drift immediately arriving at the present range of the genus?

- Why there is an apparent distribution border in central Nepal?
- Is the apparent absence of the genus from the western part of the slopes of the Himalayas due to unsuitable environments, or does it purely reflect the present status of a permanent migration to the west, so to speak representing a snapshot of a continuous process?

9. Alphabetical checklist of the species of the genus *Gunvorita* Landin

For the benefit of the reader the complete number of species of the genus *Gunvorita* presently known is combined in a revised checklist.

<i>angusticeps</i> Baehr, 1998	East Nepal
<i>apicalis</i> , sp. n.	East Nepal
<i>besucheti</i> Baehr, 1998	Northeast India
<i>denticulata</i> , sp. n.	East Nepal
<i>depressipennis</i> Baehr, 1998	Northeast India
<i>distinguenda</i> , sp. n.	East Nepal
<i>elegans</i> Landin, 1955	East Nepal, Sikkim, Northeast India
<i>globipalpis</i> , sp. n.	East Nepal
<i>hamifera</i> Baehr, 1998	East Nepal
<i>indica</i> Darlington, 1971	Northeast India
<i>inermis</i> Baehr, 1998	Northeast India
<i>laeviceps</i> Baehr, 1998	Northeast India
<i>martensi</i> Casale, 1985	East Nepal
<i>minor</i> Baehr, 1998	Northeast India
<i>nepalensis</i> Baehr, 1998	Central Nepal
<i>ovaliceps</i> Baehr, 1998	Northeast India
<i>punctipennis</i> Baehr, 1998	East Nepal
<i>schawalleri</i> Baehr, 1998	East Nepal
<i>smetanai</i> Baehr, 1998	Central Nepal
<i>uncinata</i> Baehr, 1998	East Nepal.

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ISSN 0341-0145

Schriftleitung: Dr. Wolfgang Seeger, Rosenstein 1, D-70191 Stuttgart
Gesamtherstellung: Gulde-Druck GmbH, D-72072 Tübingen